XIX.—Hippolyte fascigera, *Gosse, and* H. gracilis (*Heller*).

By Alfred O. Walker.

In September last I received from Mr. F. W. Gamble, who is working at the physiological causes of the variability in colour of *Hippolyte varians*, Leach, a specimen which he rightly considered to be *H. fascigera*, Gosse. The colour of the specimen, when received by me in formaline, was pale green, and, with the exception of the tufts of plumose setæ on the body, does not differ from *H. varians*.

H. fascigera was described by P. H. Gosse in the Ann. & Mag. Nat. Hist. ser. 2, vol. xii. (1853) p. 153. He says the tufts are "very deciduous," and, "when wanting, the animal may easily be mistaken for *H. varians*," &c. Further, he says that "it may be distinguished at once, while alive, by its colour, which, though varying, does not assume any of the phases of *H. varians*. It is usually pellucid white, clouded with opake drab, and generally blotched with dark reddish purple." Again, he states that the relative position of the teeth on the lower margin of the rostrum and "the relation of the filaments of the internal antennæ to each other in length and thickness also afford a good distinction."

In 1882 Prof. G. O. Sars ('Oversigt af Norges Crustaceer,' p. 46 [separate copy]) says that he is still doubtful of the specific distinctness of *H.* (*Virbius*) *fascigera* from *H. varians*, but he agrees with Gosse's description of its colour.

Prof. W. A. Herdman, F.R.S., in an article on the protective colouring of *H. varians*, in Trans. Liverpool Biol. Soc. vol. vii. (1893) p. 77, says that "specimens found on a sandy bottom or on small gravel are mottled black, grey, and white."

My own experience agrees with the last writer's, but I am not prepared to say that these forms had not the tufts of plumose setæ, as when I took them my attention had not been directed to *H. fascigera*. In looking through a number of *H. varians* in spirit from rock-pools on this coast, I had no difficulty in finding four or five tufted specimens, but their colour had gone. In other respects there is no difference between them and the ordinary form.

It is well known that *H. varians* is not only variable in colour, but almost, if not quite, as variable in the dentition of the lower edge of the rostrum. Kinahan (Nat. Hist. Review, vol. iv. (1857) p. 518) says "a volume might be written on the forms of the beak of this species"; he figures six varieties

on pl. x. (ix. in error). It is, however, to be noted that all these and all the specimens I have ever seen of *H. varians*, as well as Gosse's species, have only *one* tooth at the base of the rostrum, on the upper margin, and that the lower margin in adults is more or less strongly convex.

Gosse's distinctive characters therefore, besides the fascicles or tufts, consist practically only of the colour, the position of the teeth on the lower margin of the rostrum (both of which are notoriously variable), and the relative thickness of the antennular filaments, which is purely a matter of age and sex.

Mr. Gamble informs me that a fascigerous specimen shed the fascicles during life, so that they do not appear to be an integral part of the integument. And if it can be shown that similar tufts of setæ occur on at least one other species of *Hippolyte*, as I propose to do, their specific value disappears.

In the 'Journal of Marine Zoology,' vol. ii. p. 101, the editor, Mr. Jas. Hornell, has an interesting article on "The Protective Colouring of the Æsop Prawns," in which he mentions that *H. varians*, when moved to water containing weeds of a different colour from its original habitat, changes its colour to that of the weeds in a single night. He goes on to say that *H. fascigera* has much less power of colour adaptability, that it "is seldom found in any number except among tufts of coarse *Corallina*, with which it agrees *absolutely* in colour," and that its "tufts of brush-like hairs" harmonize with the minute tubicolous Annelids and Bryozoa of the rock-pools it inhabits, so that "the mimetic adaptation is greatly accentuated." But he adds in a footnote that it differs from *H. varians* in that "the only spines on the upper edge of the rostrum are *three* placed at the posterior end and really upon the carapace, while a single sharp tooth is set close to the tip on the *straight* under edge." Had Mr. Hornell seen Gosse's description of *H. fascigera* he would have recognized that the rostrum there described differed entirely from his. At my request Mr. Hornell kindly sent me a specimen which is certainly well furnished with the tufts of setæ, and as certainly is not *H. fascigera*, Gosse; it is, in fact, *H. gracilis* (Heller), a species not hitherto, so far as I know, recorded west of the Mediterranean.

According to Czerniavsky ('Crustacea Decapoda Pontica littoralia,' 1884, p. 15, pl. i.) the rostrum of this species is very variable. He figures ten or eleven forms in which the number of teeth on the upper edge at the base of the rostrum ranges from two to five, and those on the almost or quite straight (sometimes slightly concave) lower edge from one to

four. Mr. Hornell's specimen agrees with Czerniavsky's figure M.

In an earlier work by the same author ('Materialia ad Zoogr. Pont. comp.' 1868) he figures still more varieties, for drawings for which I am indebted to Dr. A. M. Norman, F.R.S., who called my attention to the fact that in two of them are shown tufts of plumose setæ.

Fig. 1.

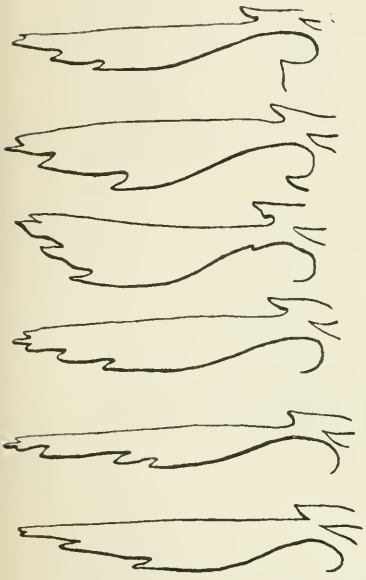

Fig. 2.

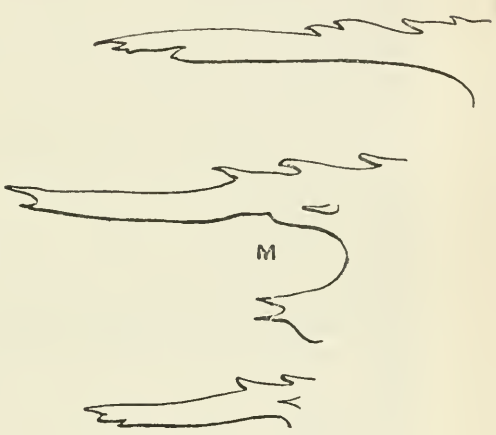

Fig. 1.—*Hippolyte varians*, Leach. (After Kinahan, Nat. Hist. Review, vol. iv. 1857, pl. x.)
Fig. 2.—*Hippolyte gracilis* (Heller). (After Czerniavsky, Crust. Decap. Pontica littoralia, pl. i.)

As it appears therefore (1) that the fascicles or tufts of setæ are not confined to *H. fascigera*, and (2) that the other distinctive characters relied on by Gosse are of no value, we may safely conclude that this species should be expunged from our lists.

There remains the interesting question as to the mode by which the tufts are acquired for protective purposes. It is to

be hoped that Mr. Gamble's researches may throw some light upon this point.

Nant y Glyn, Colwyn Bay,
Nov. 28, 1898.

The Owens College, Manchester,
Nov. 29, 1898.

Dear Mr. Walker,—

I have read the MS. which you have kindly permitted me to see. At Piel the regular habitat of *fascigera* is among masses of the polyzoon *Bowerbankia* growing on the stems of *Halidrys siliquosa*. Adults taken from this habitat agree in colour fairly closely with Gosse's description, but in captivity among green weed change in colour to a greenish or greenish-brown tinge. Should they then, as they do sometimes, shed their fascicles, there remains no feature by which they can be distinguished from typical *varians*.

The young *fascigera may* inhabit the same *Bowerbankia*, and are then freckled with brown and reddish spots on a transparent ground. But, in addition to this variety, specimens taken from fine plumose red weeds are lined and barred with red. Others, again, have a densely pigmented sheath of brown or black colour to the alimentary canal and two broad transverse bars of the same colour. Both this and the red-lined variety *are also found in specimens of H. varians* (that is, in specimens with no trace of plumose hairs) in the same haul.

It would therefore appear that the colour of the young is not distinctive.

As to the plumose hairs themselves, they are apparently normal structures, though not always symmetrically placed in the segments in which they occur; and if Gosse was right, as I believe he was, in considering them deciduous structures, I think we ought to have more evidence before considering them to be aids in protective mimicry.

I ought to add that the subject did not occupy my attention when working at Piel as fully as it does now, and therefore the observations I made should be considered as preliminary to a fuller treatment of the subject.

I am,
Yours truly,
F. W. Gamble.